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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/873,614	06/04/2001	Paul S. Weiss	P05185US1	4074

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EXAMINER	
NGUYEN, KHIEM D	
ART UNIT	**PAPER NUMBER**
2823	

DATE MAILED: 04/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/873,614	WEISS ET AL.	
	Examiner	Art Unit	
	Khiem D. Nguyen	2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 February 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-29 and 33-36* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21 and 33-36* is/are rejected.

7)☒ Claim(s) *22-29* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *04 June 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on February 18th, 2005 has been entered. A new rejection is made as set forth in this Office Action. Claims (1-29 and 33-36) are pending in the application.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

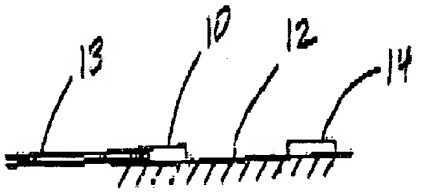
Claims 1-21 and 33-36 are rejected under 35 U.S.C. 102(e) as being anticipated by Tour et al. (U.S. Pub. 2002/0190759).

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the

reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

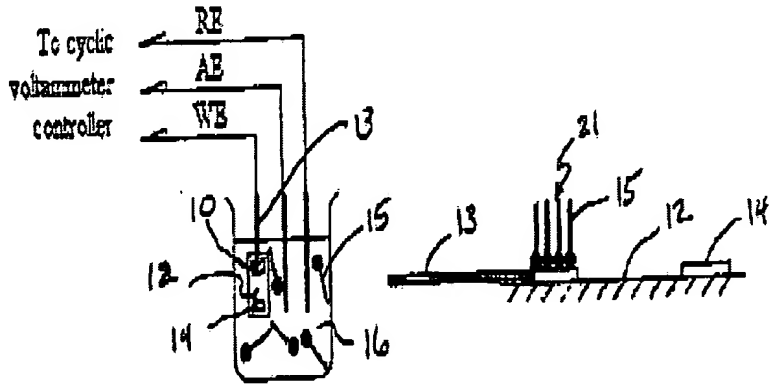
In re claim 1, **Tour** discloses a method for manufacturing nanostructure patterns comprising: overlaying a parent structure **10, 14** selectively deposited on a substrate **12** (page 2, paragraph [0028] and FIG. 2A) with a plurality of organic molecules,

(A)

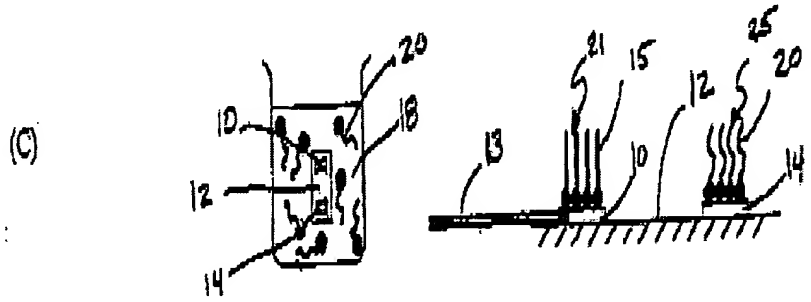


each of the plurality having a metal ion coordinating portion adsorbing on the parent structure in preference to the substrate **12** to form a deposit consisting of an organic molecule **15, 21** single layers contacting the parent structure (page 2, paragraph [0029] and FIG. 2B);

(B)



applying a metal ion solution **18** to the organic molecule single layered parent structure to attach the metal ion to the metal ion coordinating portion of the organic molecules (page 3, paragraph [0030] and FIG. 2C);



forming an organic molecule single layer attached to the metal ion;

depositing a layer **27** over the at least one parent structure **10, 14** and in contact with at least a portion of the organic structure single layer (page 3, paragraphs [0032]-[0037] and FIG. 2D); and

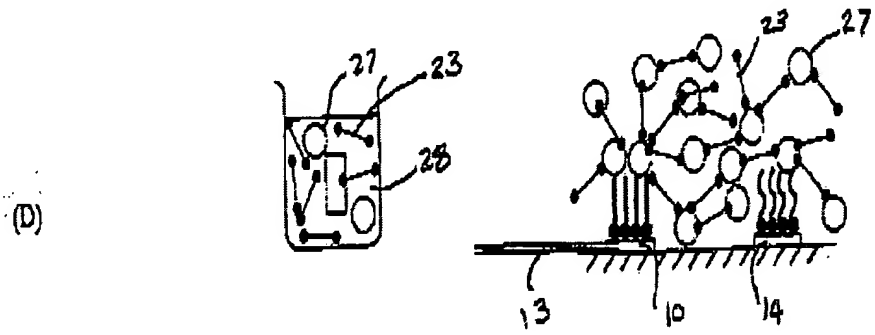


Fig. 2

removing the organic molecule single layer contacting the parent structure and the organic molecule layer to leave a residual structure (FIGS. 2A-D).

In re claims 2 and 3, **Tour** discloses that the steps of removing the organic molecule single layer contacting the parent structure is chemical and electrochemical (page 4, paragraph [0055]).

In re claim 4, **Tour** discloses that the steps of removing the molecule single layer contacting the parent structure removes a portion of the layer deposited (page 2, paragraph [0028] to page 4, paragraph [0040]).

In re claims 5-8, **Tour** discloses that the residual structure includes a line, a dot, or a ring and wherein the residual structure includes two or more adjacent lines (page 5, paragraph [0063]).

In re claim 9, **Tour** discloses that a first portion of the at least one parent structure is a first material and a second portion of the at least one parent structure is a second material (page 2, paragraph [0028]).

In re claims 10-11, it is well-known to one of ordinary skill in the art of making semiconductor devices to image the nano residual structure with scanning probe microcopy because at lower target concentrations, the nano residual structure could not be visualized with the naked eye.

In re claim 12, **Tour** discloses that the substrate is silicon (page 4, paragraph [0046]).

In re claim 13, **Tour** discloses that the organic molecule is a mercaptoalkanoic acid (page 6, paragraph [0065]).

In re claim 14, **Tour** discloses that the organic molecule single layer contacting the parent structure and the organic molecule single layer are connected with ions (FIGS. 2A-D).

In re claim 15, **Tour** discloses that the ions are Cu^{2+} ions (page 3, paragraph [0037]).

In re claims 16, 17, 18, **Tour** discloses smoothing the at least one parent structure (page 2, paragraph [0028] and FIGS. 2A-D) and is accomplished chemically or electrochemically.

In re claim 19, **Tour** discloses designing the at least one parent structure to result in the residual structure having a width less than a width of the at least one parent structure (FIGS. 2A-D).

In re claim 20, whether the at least one parent structure to have a concave segment is inherently depends on the desired result one want to obtain.

In re claim 21, **Tour** discloses removing a portion of the residual structure (FIGS. 2A-D).

In re claim 33, **Tour** discloses designing the at least one parent structure to result in the residual structure being spaced more closely than the at least one parent structure (FIGS. 2A-D).

In re claim 34, **Tour** discloses that the method of claim 1 further comprising the step of repeating in sequence the steps of applying the metal ion solution and forming the organic molecule layer (FIGS. 2A-D).

In re claim 35, **Tour** discloses that the repetition step is repeated until up to 39 layers of the organic molecule single layer are formed. The practitioners may repeat the step to obtain as many as organic molecule layer as he/she wishes.

In re claim 36, **Tour** discloses that the substrate is a silicon oxide (page 4, paragraph [0046]).

Allowable Subject Matter

Claim 22 and claims 23-29, which depending on it are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Applicants' Arguments and Amendment

Applicants contend that Independent claim 1 has been amended to recite with greater specificity the process by which inventive organic molecule single layers (synonomously known as monolayers) are successively built up on a parent structure to form a deposition mask. Contrary to the prior art of record, the inventive organic molecule layer absorbs preferentially on a parent structure as compared to a substrate to form a self-assembled monolayer. Successive organic molecule layers are added with intermediate application of a metal ion solution.

In response to Applicants' contention that the prior art combination of Marukawa (U.S. Patent 5,627,090) and Matsui (IEEE Vol. 85, No. 4, April 1997) fails to teach or contemplate applying a metal ion solution to the organic molecule monolayer contacting the parent structure or subsequently attaching another monolayer via the metal ion, as required by independent claim 1, Examiner respectfully disagrees. Applicants' argument

is moot in view of the newly discovered reference Tour et al. (U.S. Pub. 2002/0190759). Tour discloses a method for manufacturing nanostructure patterns comprising: overlaying a parent structure 10, 14 selectively deposited on a substrate 12 (page 2, paragraph [0028]) with a plurality of organic molecules, each of the plurality having a metal ion coordinating portion adsorbing on the parent structure in preference to the substrate 12 to form a deposit consisting of an organic molecule 15, 21 single layers contacting the parent structure (page 2, paragraph [0029] and FIG. 2B); applying a metal ion solution 18 to the organic molecule single layered parent structure to attach the metal ion to the metal ion coordinating portion of the organic molecules (page 3, paragraph [0030] and FIG. 2C); forming an organic molecule single layer attached to the metal ion; depositing a layer 27 over the at least one parent structure 10, 14 and in contact with at least a portion of the organic structure single layer (page 3, paragraphs [0032]-[0037] and FIG. 2D); and removing the organic molecule single layer contacting the parent structure and the organic molecule layer to leave a residual structure (FIGS. 2A-D) (See the rejection presented in this Office Action). Thus, Tour discloses the Applicants' claimed invention. For this reason, Examiner holds the rejection proper.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khiem D. Nguyen whose telephone number is (571) 272-1865. The examiner can normally be reached on Monday-Friday (8:30 AM - 5:30 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on (571) 272-1855. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

K.N.
April 22nd, 2005

W. DAVID COLEMAN
PRIMARY EXAMINER